2SD2046

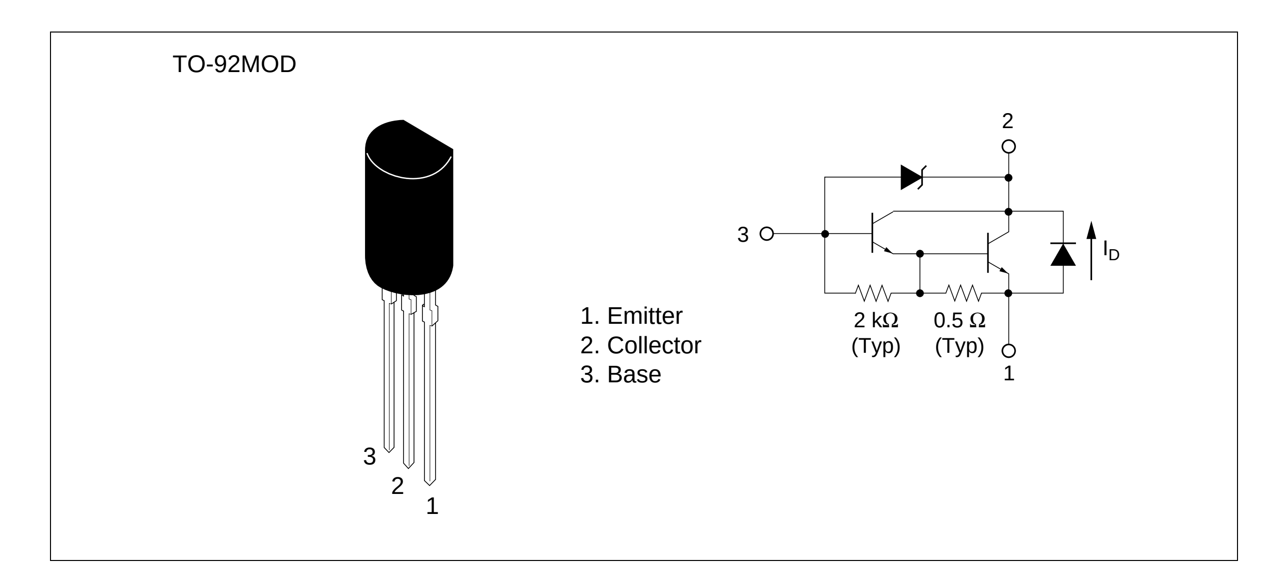
Silicon NPN Epitaxial, Darlington

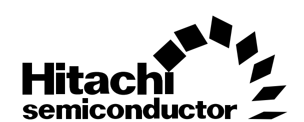
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Application

Low frequency power amplifier

Outline





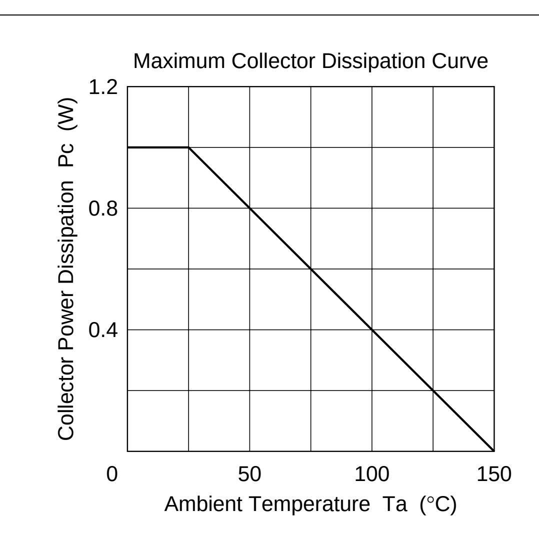
Absolute Maximum Ratings (Ta = 25°C)

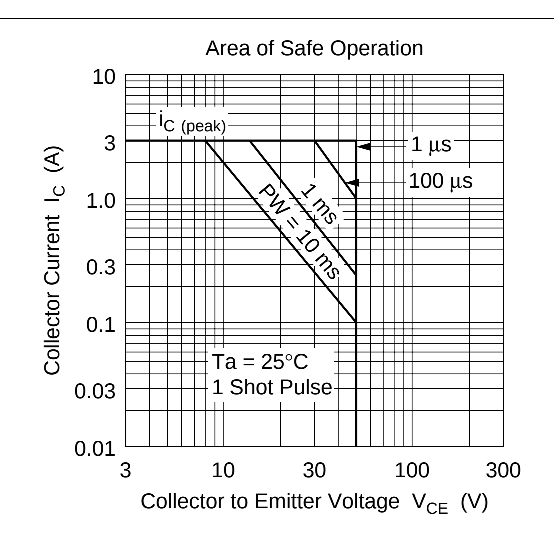
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	50	V
Emitter to base voltage	V_{EBO}	7	V
Collector current	I_C	1.5	A
Collector peak current	$ic_{(peak)}$	3.0	A
Collector power dissipation	P_C	1.0	W
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C
E to C diode forward current	I_D	1.5	A

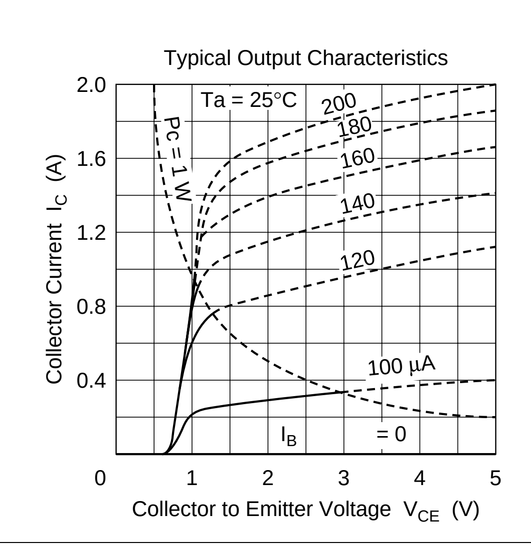
Electrical Characteristics (Ta = 25°C)

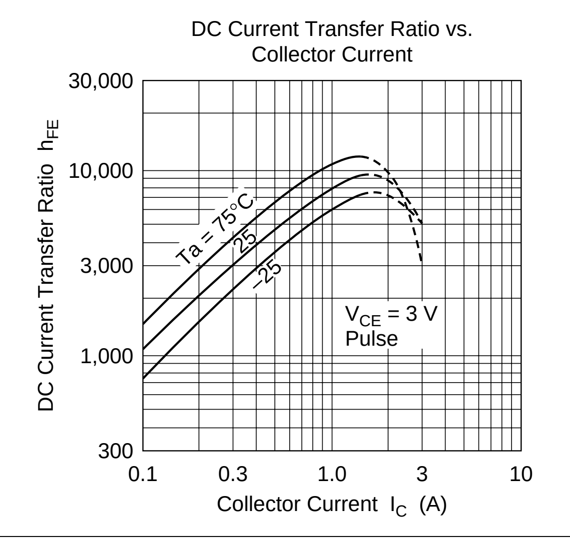
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage (Zener breakdown voltage)	$V_{(BR)CBO}$ (V_z)	50	60	70	V	I_C = 0.1 mA, I_E = ∞
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	50	—	—	V	I_C = 10 mA, R_{BE} = ∞
Emitter to base breakdown voltage	$V_{(BR)EBO}$	7	—	—	V	I_E = 50 mA, I_C = 0
Collector cutoff current	I_{CEO}	—	—	10	µA	V_{CE} = 40 V, R_{BE} = ∞
DC current transfer ratio	h_{FE}	2000	—	10000		V_{CE} = 3 V, I_C = 1 A*[1]
Collector to emitter saturation voltage	$V_{CE(sat)1}$	—	—	1.5	V	I_C = 1 A, I_B = 1 mA*[1]
	$V_{CE(sat)2}$	—	—	2.0	V	I_C = 1.5 A, I_B = 1.5 mA*[1]
Base to emitter saturation voltage	$V_{BE(sat)1}$	—	—	2.0	V	I_C = 1 A, I_B = 1 mA*[1]
	$V_{BE(sat)2}$	—	—	2.5	V	I_C = 1.5 A, I_B = 1.5 mA*[1]
E to C diode forward voltage	V_D	—	—	3.0	V	I_D = 1.5 A*[1]

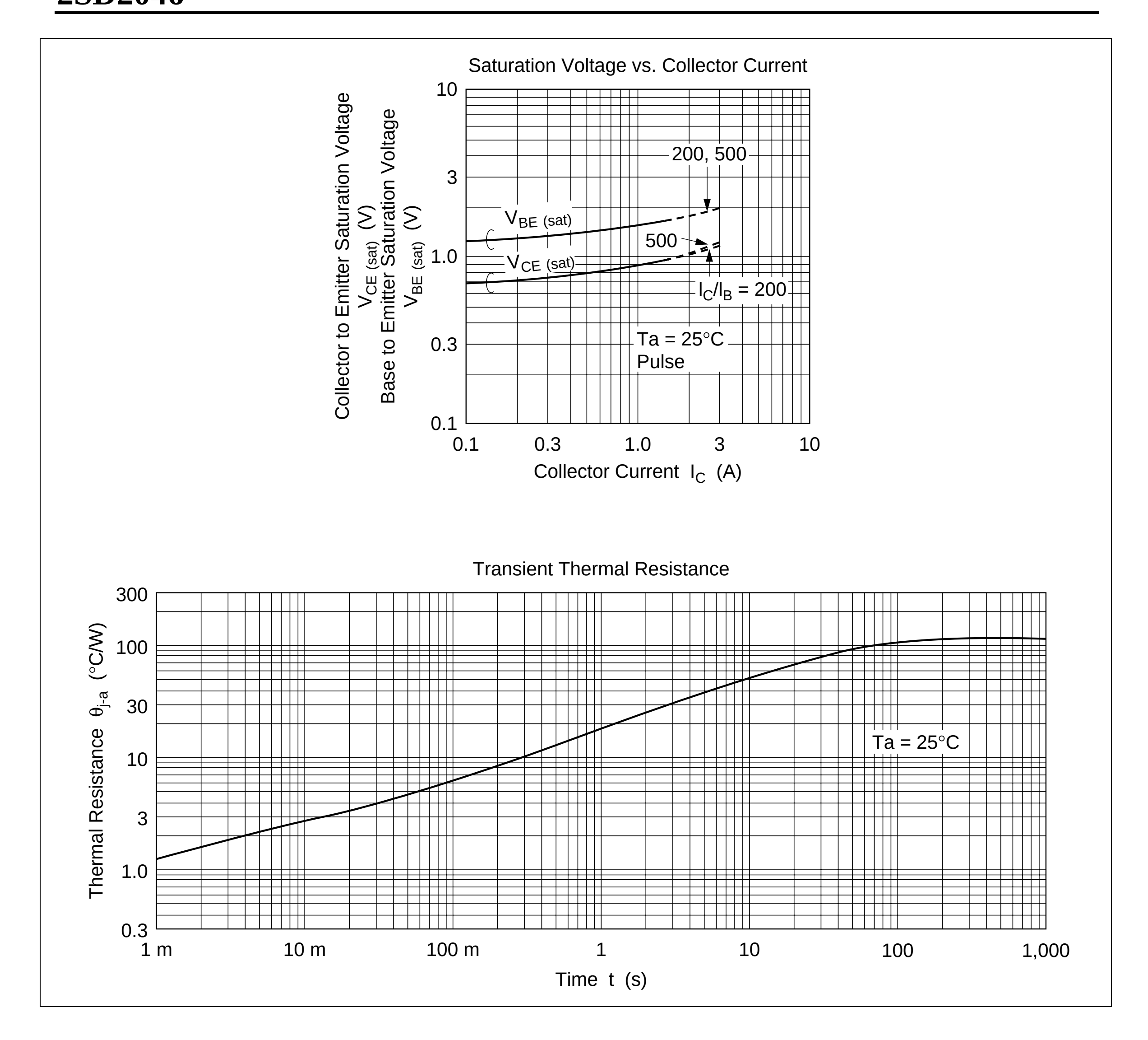
Note: 1. Pulse test


Maximum Collector Dissipation Curve
Collector Power Dissipation Pc (W)
1.2
0.8
0.4
0
50
100
150
Ambient Temperature Ta (°C)

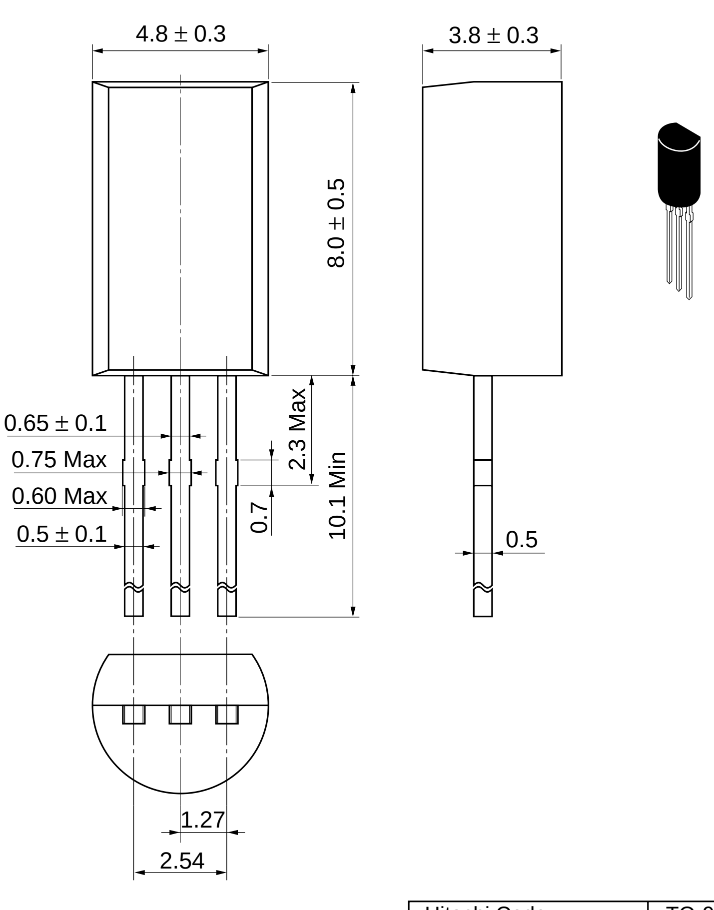

Area of Safe Operation
Collector Current IC (A)
10
3
1.0
0.3
0.1
0.03
0.01
iC (peak)
1 µs
100 µs
1 ms
PW = 10 ms
Ta = 25°C
1 Shot Pulse
3
10
30
100
300
Collector to Emitter Voltage VCE (V)


Typical Output Characteristics
Collector Current IC (A)
2.0
1.6
1.2
0.8
0.4
0
Ta = 25°C
200
180
160
140
120
100 µA
Pc = 1 W
IB = 0
1
2
3
4
5
Collector to Emitter Voltage VCE (V)


DC Current Transfer Ratio vs. Collector Current
DC Current Transfer Ratio hFE
30,000
10,000
3,000
1,000
300
Ta = 75°C
25
–25
VCE = 3 V
Pulse
0.1
0.3
1.0
3
10
Collector Current IC (A)


Saturation Voltage vs. Collector Current
Collector to Emitter Saturation Voltage $V_{CE\ (sat)}$ (V)
Base to Emitter Saturation Voltage $V_{BE\ (sat)}$ (V)
10
3
1.0
0.3
0.1
0.1
0.3
1.0
3
10
Collector Current I_C (A)
200, 500
$V_{BE\ (sat)}$
500
$V_{CE\ (sat)}$
I_C/I_B = 200
Ta = 25°C
Pulse
Transient Thermal Resistance
Thermal Resistance $\theta_{j\text{-}a}$ (°C/W)
300
100
30
10
3
1.0
0.3
1 m
10 m
100 m
1
10
100
1,000
Time t (s)
Ta = 25°C

Unit: mm



Hitachi Code	TO-92 Mod
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.35 g

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